



**Environmental Resource Committee (ERC) Meeting  
Sunset Beach Town Hall Council Chambers (visitors staged in Conference Room)  
Wed., September 16, 2020  
10:00 am**

**AGENDA**

- 1) Call to Order. Quorum determination. Meeting declared open.
- 2) Amendment / Approval of Draft Agenda. Motion to approve.
- 3) ERC Member Housekeeping Discussions (on items not covered below). Self introduction of two new ERC Members – **Harold Golding, Gregg Acri**
- 4) Presentation by invited guest speaker, **Samantha Burdick**, Coastal Resilience Coordinator, NCDRCM (Div. of Coastal Mgt.). Topic will be ***“Resilient Coastal Communities Program”***. **(10:15-11:45AM)**.
- 5) Consideration ERC Mtg. Minutes of 2/19/2020 (minutes attached). Motion to approve.
- 6) Public comments (on agenda items... 3-minute max.). No deliberation.
- 7) Mtg. discussion items for ERC Committee Members ***(time will not allow discussion of these items at today’s ERC Mtg., but listed below as place reminders for next ERC Mtg.)***.
  - a) Town’s recycling program (program details attached). – **T. Rademacher**
  - b) Update ERC on progress, “Demonstration Rain Garden”.
    - i) Discuss ***“Rain Garden Manual”*** (Manual attached) – **J. Michaux**
    - ii) Next steps towards moving forward with project – **P. Larkin**
  - c) Update ERC on Sunset Vision Group’s “Beach Walkers for Beach Litter” program – **P. Larkin**
  - d) Presentation of “photos” showing alternate roadway mat’ls. being used by Town DPW on unpaved roads – **J. Michaux**
  - e) ERC future ‘guest speaker’ suggestions, for an **educational** public forum presentation on environmental topic.
    - i) Discuss possible topics and speakers – **all ERC Members**
    - ii) Need ERC Member to follow-up to make initial contact with selected topic / speaker (need ERC volunteer) and start planning – **all ERC Members**

f) Single-Use Plastics “educational brochure”, initial steps – **P. Larkin**

g) TREE CITY USA Program application status – **T. Rademacher / P. Larkin**

i) “Arbor Day Proclamation” event of 4/24/2020 at Town Hall by Mayor.

ii) Approved and adopted by Town Council.

8) Agenda items for 10/21/2020 mtg. (and future ERC meetings).

9) Public comments on ERC potential future topics (3-minute). No deliberation.

10) Motion to Adjourn.

**Town of Sunset Beach  
Environmental Resource Committee (ERC) Meeting  
February 19, 2020**

**Minutes**

**Members Present:** Pete Larkin, Tim Kenney, and Don Eggert

**Members Absent:** John Farrell

**Staff Present:** John Michaux, Stormwater Manager; Todd Rademacher, Planning Director

**Council Members Present:** None

**Call to Order**

After determining a quorum was present, the meeting was called to order at 10:00 AM.

**Amendment and Approval of Draft Agenda. Motion to accept Agenda**

After a motion by Don Eggert that was seconded by Pete Larkin, the draft agenda was accepted by a three to zero vote.

**ERC Member Housekeeping Discussions**

There were no housekeeping items to discuss at this time.

**Approval of ERC Meeting Minutes of 1/15/2020**

The minutes were approved after a motion from Pete Larkin that was seconded by Tim Kenney by a vote of 3-0.

**Public Comments**

None

**Town's CAMA 2017 Land Use Plan**

a) The town is considering updating the 2017 Land Use Plan. It was determined that the ERC will await Town Council instructions prior to inviting Mike Christianbury for a presentation.

b) It was again encouraged that ERC members who have not read the plan, make themselves familiar with it.

**Meeting Discussion**

a) Pete Larkin attended the Town Council meeting and had the following updates concerning recycling programs and the 2020 council budget.

i) Pete reported that Town Staff did a financial review of overall recycling program costs. They reported that without the Town Staff doing all the administrative work for the program, a more accurate cost might be \$85 per household on the mainland and \$115 per household on the island.

ii) The Town Council might possibly consider a budget for the ERC going forward.

b) Todd Rademacher is working on the Tree City USA application at this time and has asked the Town Council to adopt a resolution for an Arbor Day Proclamation or celebration that is required for entrance into the Tree City USA Program.

c) Don Eggert and Todd Rademacher updated the committee on their visit to the Oak Island EAC meeting of 1/16/2020. They reported the following:

The Oak Island EAC has at this time, 10-12 members that break into subcommittees in order to discuss various environmental issues. Their primary focus is on public education that is accomplished through programs such as public outreach, having guest speakers on environmental topics, and using Tree City USA Grants to have tree plantings.

d) Pete Larkin reported that he attended the Sunset Beach Town Community meeting of 1/25/2020. He stated that the meeting was fairly well attended and two ERC items were discussed:

i) The reduction in use of single use plastics by businesses in the area. Pete is looking into the creation of a brochure educating the public on this topic.

ii) The alligator population. The ERC supports the police in their plan to relocate any alligators that require it versus generating a controlled hunt to reduce the population.

e) Don Eggert and John Michaux updated the committee on the construction of the demonstration rain garden on the west side of Town Hall. A student in environmental engineering will help with the design of the rain garden. Mark Bevins, Director of the Brunswick County Cooperative Extension, will provide staff to answer questions that may come up with the rain garden as well as the new parking lot project on the east side of Town Hall.

### **Public Outreach and Education**

Todd and John suggested that gravel roads management, specifically material performance differences would be a good topic to further educate the citizens of Sunset Beach.

Information concerning durability and storm water runoff as a function of cost to the Town would be included in the information provided.

### **Agenda Items for 3/18/2020**

Pete will attend the upcoming Planning Board meeting in which the use of native plant species will be discussed among other topics. John Michaux will gather more information on paving materials and Todd will arrange a tour of the recycling plant in Jacksonville for the ERC members.

### **Public Comments on ERC**

None

### **Adjourn**

The meeting was adjourned by motion of Tim Kenney, seconded by Don Eggert. Motion passed 3-0.

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Pete Larkin, Chairman

Submitted by:

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Tim Kenney, Recording Secretary

## 2020/2021 Recycling Program

Annually, the Town negotiates with Green for Life/Waste Industries for a discounted rate for residential recycling services. This year, the rate is \$85 for mainland residents and \$115 for island residents. The island rate is higher because recycling services become weekly during the summer months. A customer contracting directly with Green for Life/Waste Industries would pay \$155.76 annually for every other week recycling services. Please pass this information along to neighbors and absentee owners to encourage participation in the program.

This year, we have added the option to email your completed [application](#) to [info@sunsetbeachnc.gov](mailto:info@sunsetbeachnc.gov) and to make your payment online on the Town website [www.sunsetbeachnc.gov](http://www.sunsetbeachnc.gov) homepage (top right side). Please submit your application and fee by September 4, 2020 to take advantage of the discounted rate.





**A PROGRAM  
OF  
NORTH CAROLINA COOPERATIVE EXTENSION**

## Table of Contents

-  Common Rain Garden Questions Answered
-  Quick Steps to Building a Rain Garden
-  Further Information

## Program Team

Andrew Anderson, Extension Associate for NCSU Biological and Agricultural Engineering Department

Wendi Hartup, County Agent based with Forsyth County Cooperative Extension

Bill Hunt, Extension Specialist for NCSU Biological and Agricultural Engineering Department

Bill Lord, Area Agent based with Franklin County Cooperative Extension

Mitch Woodward, Area Agent based with Wake County Cooperative Extension



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Manual by Wendi Hartup



# Common Rain Garden Questions Answered

**What is a rain garden?** A garden shaped into a bowl-like depression in the ground to capture rainfall runoff from your rooftop and driveway and allow water to filter into the ground. The plants, mulch and soil in a rain garden combine natural processes to filter pollutants from runoff and break down in the soil over time.

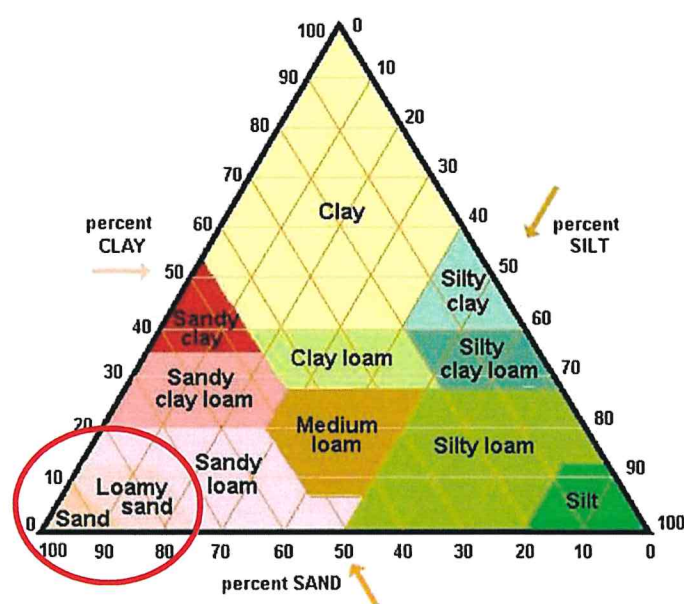


**Why do we need rain gardens?** Many of our forests and other vegetated areas are developed into impervious surfaces like parking lots, roads and buildings. As plants are replaced with hard, compacted surfaces, the rainwater is unable to disperse energy and gradually soak into the ground. Instead this stormwater races across pavement picking up pollutants and sediment as it moves along curbs and ditches to storm drains; which empty directly into local waterbodies.

## What are the benefits of rain gardens?

- ♻️ Easy to design, install and maintain
- ♻️ Come in all shapes and color schemes
- ♻️ Provide aesthetic appeal while blending into landscape
- ♻️ Provide habitat for wildlife, butterflies and beneficial insects
- ♻️ Absorb nutrients and some heavy metals
- ♻️ Enhance infiltration, stabilize soil and minimize runoff to storm drains

**What type of soil conditions are needed for a rain garden?** Rain gardens are essentially a water infiltration device. Ideally the soil conditions for rain gardens should have high percentages of sand with some loam and/or clay content to support plant growth and encourage infiltration (see red circle in diagram below).



Soil Texture Diagram

Rather than trying to change your soil conditions, consider working with how your soil drains and picking plants appropriate for that soil type.

**Will this work without plants or just grass?** Yes, just aerating the soil reduces soil compaction but do be sure to cover with some type of mulch. It will also work with just grass but you will need to mow it at 4 inches or at the highest setting. Using plants helps the rainwater to travel more efficiently through the soil to recharge groundwater. Native perennial root systems can extend 2 feet or more if the conditions are right! Turf root systems usually only grow 4-6 inches deep.



### What types of plants are suitable for a rain garden?

- ♻️ Tolerate periods of saturated soil, yet also thrive under dry conditions
- ♻️ Most natives
- ♻️ Sustainable and low maintenance

### What types of plants are NOT suitable for a rain garden?

- ♻️ Trees (growth changes sun conditions and alters spacing available for other plants)
- ♻️ Heavy feeders (ex. Crape Myrtle)
- ♻️ Plants that do not like “wet feet” (ex. Asian Azalea cultivars)
- ♻️ Plants susceptible to root rot (ex. Flowering Dogwood)
- ♻️ Plants with aggressive root systems (ex. Willows)

**Does a rain garden form a pond?** No. Rain gardens are designed to allow a typical one-inch rainfall to soak into the ground within three days (Note: a wetland garden would allow water to pool longer than 3 days).

**Will there be standing water?** Yes, after a rain there will be water in your garden. It may even look flooded. THIS IS OKAY! There may be 6”-9” of standing water for up to three days. This ponding will allow for the stormwater to slowly infiltrate into the ground.

**Are they a breeding ground for mosquitoes?** Not if they are draining properly. Most mosquitoes need about a week to complete their entire lifecycle. Mosquitoes are more likely to lay eggs in bird baths, storm drains, corrugated pipe attached to downspouts and lawns than in a sunny rain garden. Also rain gardens attract dragonflies, which eat mosquitoes!

**Will I have to water the rain garden?** After planting, yes! First season, yes! In droughts, yes! In rain, no!

**Is a rain garden expensive?** It doesn't have to be. The main cost will be purchasing the plants (often these are already in the landscape or swap plants with your neighbor) and mulch.



Sandy Ridge Community Center Rain Garden



Apex, NC Town Hall Rain Garden



# Quick Steps to Building a Rain Garden



## STEP 1: LOCATE THE RAIN GARDEN

Observe your yard during a rainfall event. Determine where water begins flowing and where it is going. Rain gardens should ideally be located between the source of runoff (roofs and driveways) and the runoff destination (drains, streams, low spots, etc.). Be sure to consider the following:

**♻️ IMPORTANT: Do not place rain garden uphill of homes, septic systems or wellheads!**

- ♻️ Locate at least 10' away and downslope of the house foundation, if crawlspace or basement (if home is on a slab locate downslope of foundation).
- ♻️ Locate 25' away and downslope of a septic system drain field.
- ♻️ Locate 10' away and downslope of a well head.
- ♻️ Avoid underground utility lines **BEFORE** you dig (Call 1-800-632-4949 or 811 in NC).
- ♻️ The best location for the garden will be in partial to full sun (at least 4 hrs of sunlight).

## STEP 2: DETERMINE DRAINAGE OF SOILS

Rain gardens work best when constructed in well-drained soils, but they can also be installed on sites with less permeable soils with more clay content. Determining how the soil drains will help determine the type of plants most likely to succeed in the rain garden.

Pick a few places and dig a one-ft-deep hole for the preliminary infiltration test; then fill with water a few times. Time how long it takes for the test pit to drain. If satisfied with drainage time, dig 2-3 more one-ft-deep holes in that area to get an average drain time. **CAUTION:** In floodplain areas or East of I-95, dig two-ft-deep holes where high water tables are probable (highest in winter). The table below summarizes what type of practice to use based on drain time.

Drain Time	Appropriate Rain Garden Type
< 12 hours	Quick Draining Rain Garden
12 - 72 hours	Standard Rain Garden
> 3 days	Wetland Garden



Signs of an impermeable, compacted and/or wetland soil.

- ♻️ The site ponds water or remains saturated for over four days after a storm event.
- ♻️ Water poured in the dug hole is still there after four days, provided it hasn't rained.
- ♻️ The soil shows signs of being a wetland soil within a foot of the surface. A wetland soil is often gray with ribbons or areas of brown color. It can also smell like rotten eggs.

**Conduct drainage test at least twice at each hole! Also a good time to collect soil for testing to determine proper lime application.**



### STEP 3: SIZE THE RAIN GARDEN

Determine which impermeable surfaces (roof top and driveway) will be treated with the rain garden. Measure the length and width of these surfaces and multiply together to get the surface area in square feet. This will be your watershed size.

The size of the rain garden should be at least 10% of the impervious surface draining to the rain garden. Rain gardens should be designed to pond 10 inches of rainwater on top of the mulch. Rain gardens that are 10% of the watershed and have a 10" ponding depth should capture the majority of one-inch storms.

$$(\text{Length of surface} \times \text{Width of surface}) \times .10 = \text{total rain garden area sq. ft.}$$

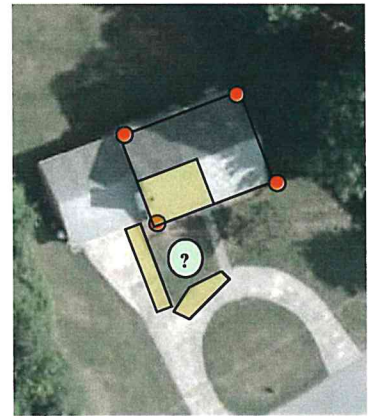
EXAMPLE: A portion of a 60' by 60' house (4 downspouts total) and 500 sq ft of driveway runs off to the rain garden location. The rain garden will capture 1 inch of rainfall, what size should the rain garden be?

$$\text{Roof area} = \frac{60 \times 60}{4} = 900\text{ft}^2$$

Roof area plus driveway:  $900 + 500 = 1400 \text{ sq ft}$

Divide square footage by 10:  $1400/10 = 140 \text{ sq ft}$

A 11'X12' or 14'X10' garden design would be sufficient.



The size of your rain garden can also depend on the space available and your budget. If you don't have enough space, you can build multiple rain gardens or build a smaller one and plan for it to overflow more often.

### STEP 4: CONSTRUCT THE RAIN GARDEN

Consider how rainwater gets to your rain garden. Will the water sheet flow across the landscape from the downspout? Will the water be piped underground to daylight into the rain garden?

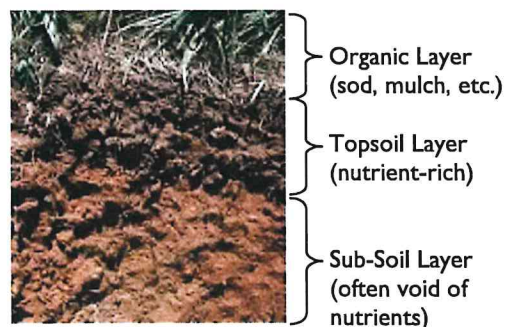
Lay out the boundary of the garden to keep a shape. You can use a rope, spray paint or even flags to outline your shape. Keep in mind how you determined the infiltration time period in Step 2.

NOTE: Always determine where utility lines are located BEFORE you start to dig. CALL 811!

#### Helpful Tools

- |                           |                            |
|---------------------------|----------------------------|
| ♻️ Auger                  | ♻️ Tamper                  |
| ♻️ Tape Measure           | ♻️ Wheelbarrow             |
| ♻️ Shovels and/or Backhoe | ♻️ Line Level and/or Ruler |
| ♻️ Rakes                  | ♻️ Stakes and String       |
| ♻️ Pitchforks             | ♻️ Tarp                    |
| ♻️ Trowels                | ♻️ Extra Labor             |

- ♻️ If present, remove and save sod for berm and weir
- ♻️ Remove any topsoil and set aside.
- ♻️ Dig to account for 10" ponding depth.
- ♻️ Dig to account for 3" of mulch.
- ♻️ Rough up 4"-6" of the bottom so it is not compacted and mix in topsoil you removed earlier. This will not only improve drainage but help plants survive. This is a good time to apply lime if you took a soil test.



NOTE: Contact your County's Cooperative Extension office for soil sampling boxes or visit <http://www.ncagr.gov/agronomi/sthome.htm/>

### Forming the Berm and Overflow Weir

Your rain garden is designed to capture the first inch of rainfall. Rainfalls larger than 1" will cause the rain garden to overflow. Rain gardens should have distinct entrances and exits to prevent erosion.



### Rain Garden Entrance

Establish a 1'-2' grass strip, rock border or combination along the upper edge of the rain garden to slow down the runoff water as it enters the rain garden. If piping downspouts to rain garden, make sure the pipe opens up into the rain garden and is not buried.





### Rain Garden Exit

You will have lots of soil available from digging. Place extra soil on the downhill side of the rain garden to create a berm, an earthen dam or barrier that holds water inside. Most rain gardens have berms about 3" - 6" tall. Compact the soil slightly with your feet or shovel as you build the berm. Cover with turf grass sod, mulch, plants, or rocks.

You will need to design a weir or nature will do that for you. A weir is an area of the berm that allows water to gently pass over it. Typically weirs are a one-foot wide section of the berm and several inches lower than the rest of the berm. To properly size the weir, use the amount of impervious surface area (see table below). Weirs can be covered with turf grass sod or rocks; additionally they can be made of wood. Make sure the weir is level and lower than the rest of the berm.

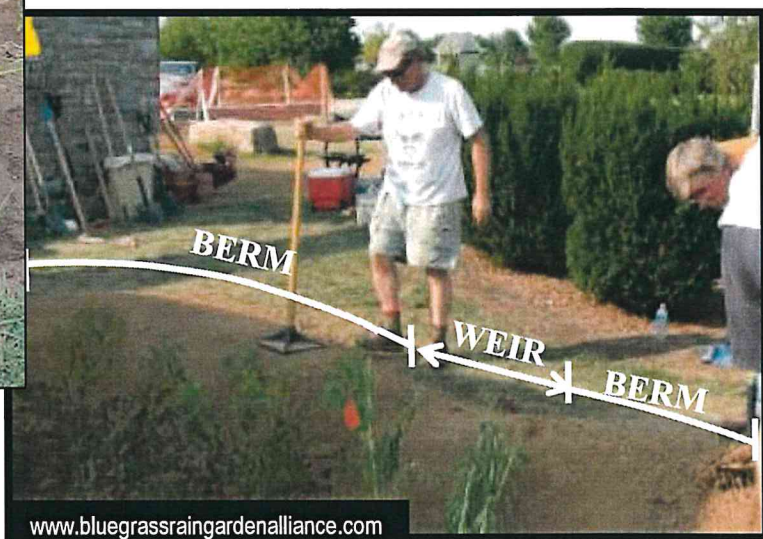
**Weir Sizing Table**

Impervious Surface Area (ft <sup>2</sup> )	Overflow Weir Length (ft)
2000 or less	1.0
3000	1.5
4000	2.0
5000	2.5

Guilford Cooperative Extension Rain Garden



Dixie Classic Fairgrounds Rain Garden

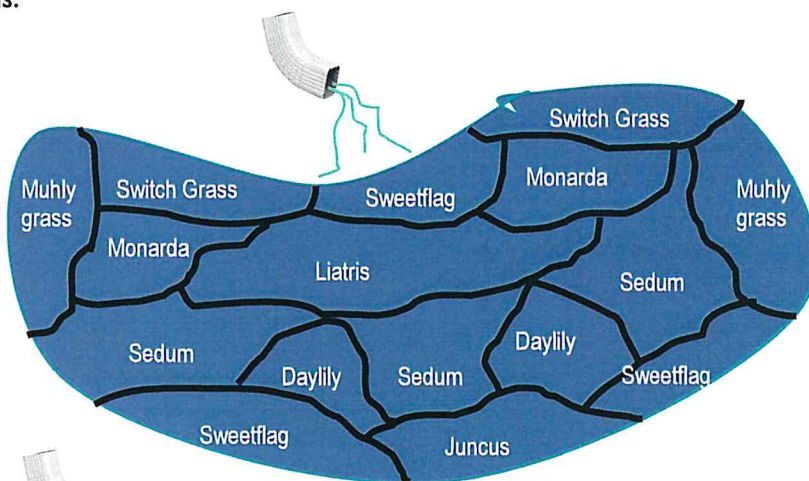


[www.bluegrassraingardenalliance.com](http://www.bluegrassraingardenalliance.com)

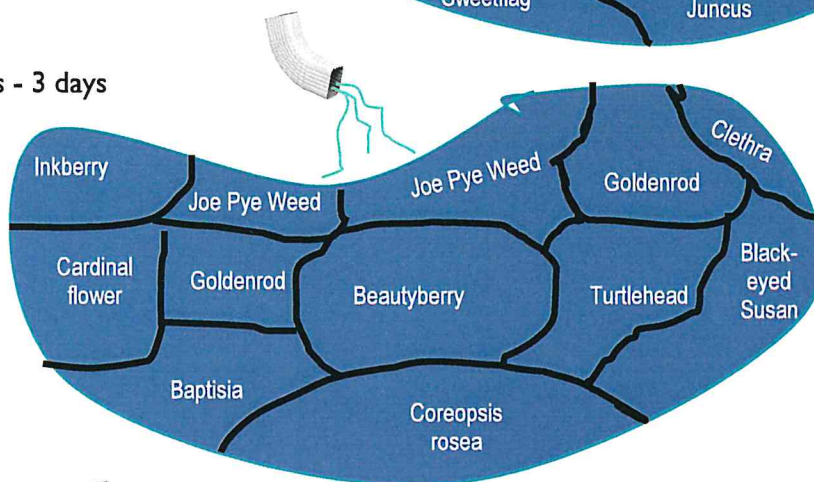
## Adding Plants

Pick your plants based on how your soil drains so you are working with nature instead of against it. Below are example rain garden plans.

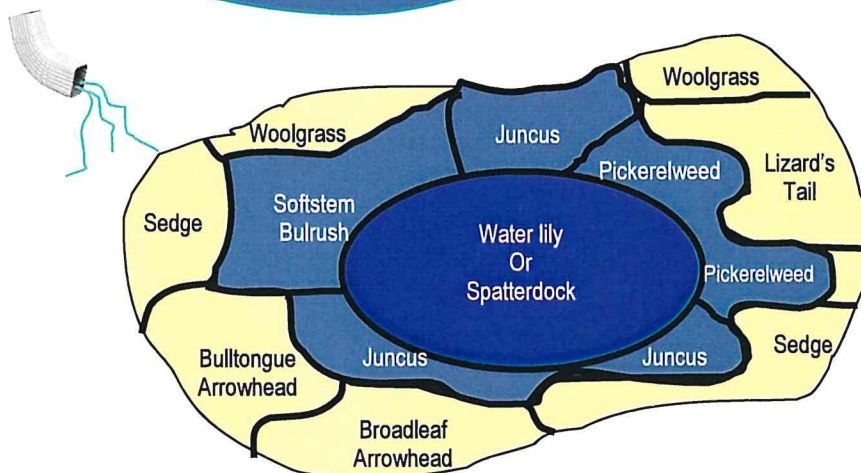
Drains in <12 hrs



Drains in 12 hrs - 3 days



Drains in >3 days



- ♻️ Add 3" double or triple shredded hardwood mulch.
- ♻️ Direct the downspout to the rain garden.



## STEP 5: WATER AND WEED THE RAIN GARDEN

Make sure to water every 7-10 days without adequate rainfall (1" per week) until plants become established; usually takes the first year. Once established, plants should be watered in long periods of drought.

Fertilizers are typically not necessary.

Refresh mulch annually. Loosen existing mulch and add only if needed up to 3 inches of mulch. Best times to mulch are after 1st frost in fall or after last frost in spring, otherwise the plants could be insulated too soon. Un-mulched surfaces may develop into a hardpan, a condition in which the soil surface becomes cemented together, forming a hard, impervious layer. Make sure mulch is only 3-4 inches; too much mulch will reduce ponding and function of rain garden.

Weed regularly during plant establishment, as newly planted species may have a tough time competing with weeds. Once plants become established, less weeding will be required.

Pruning may be needed to let some of the other plants grow. In the winter, leave dormant plants standing and deadheads for bird food. Cut back in the spring.

Keep your garden healthy and clean. Rain gardens should be periodically cleared of dead vegetation and any debris that may collect. Replanting may be necessary over time. If a plant is not doing so well in one location of the garden, it may have to be moved to a wetter or dryer area.

Your garden may need a bit more maintenance than a lawn in the beginning, but in the long run it will be easier to care for and provide many added benefits!

<b>Rain Garden Maintenance Tasks and Schedule</b>	
<b>TASK</b>	<b>SCHEDULE</b>
Prevent Soil Erosion	Keep watch on out parcels and parking lot use
Trash removal	Weekly
Pruning	Annual
Mulch renewal	After 1st frost in fall or last frost in spring
Mulch removal	Every 3 years
Weeding and Plant replacement	As needed
Remove sediment	As needed or during mulch renewal
Perimeter Mowing	As needed, keep clippings out of rain garden

## RESOURCES

Documents and websites consulted in the development of this document include:

Hunt, Bill. "How to Build Your Own Backyard Rain Garden." N.C. Cooperative Extension.  
[http://www.bae.ncsu.edu/topic/raingarden/Entire\\_handout.doc](http://www.bae.ncsu.edu/topic/raingarden/Entire_handout.doc)

NC State

 <http://www.bae.ncsu.edu/topic/raingarden/>

 <http://www.bae.ncsu.edu/stormwater>

 <http://plants.ces.ncsu.edu/>

National Wetland Plant List. US Army Corps of Engineers.  
<http://rsgisias.crrel.usace.army.mil/NWPL/>

The Oregon Rain Garden Guide: A Step by Step Guide to Landscaping for Clean Water and Healthy Streams. Oregon State University.  
<http://seagrant.oregonstate.edu/sgpubs/onlinepubs/h10001.pdf>

Rain Gardens: A How-to Manual for Homeowners. University of Wisconsin-Extension.  
<http://clean-water.uwex.edu/pubs/pdf/home.rgmanual.pdf>

Rain Gardens: A Rain Garden Manual for South Carolina. Clemson University.  
[http://www.clemson.edu/public/carolinaclear/cc\\_toolbox/index.html](http://www.clemson.edu/public/carolinaclear/cc_toolbox/index.html)

Ruth, Cliff. Plants for Constructed Wetlands and Rain Gardens.  
<http://www.ces.ncsu.edu/copubs/env/water/018/RaingardenPlantsBrochure.pdf>

### NATIVE PLANT SUPPLIERS

Many seed companies available online.

North Carolina Native Plant Society, <http://www.ncwildflower.org/natives/sources.htm>

### FOR FURTHER ASSISTANCE, CONTACT YOUR LOCAL COOPERATIVE EXTENSION OFFICE

North Carolina, <http://www.ces.ncsu.edu/>

Nationally, <http://www.csrees.usda.gov/Extension/index.html>





Revised February 2015